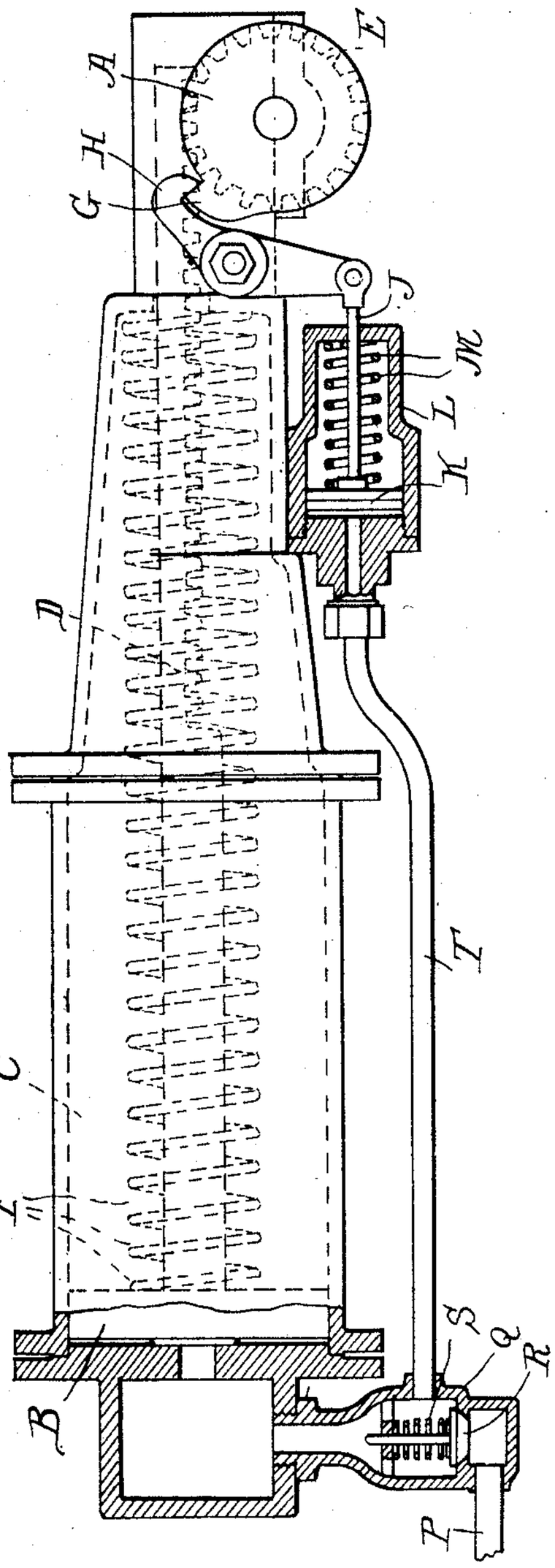
No. 630,939. Patented Aug. 15, 1899.

S. H. SHORT.

CONTROLLING MECHANISM FOR ELECTRIC RAILWAY CARS.

(Application filed Dec. 7, 1898.)

(No Model.)



Witnesses.
Wm. M. Rheem.
Edward F. Barrett.

Inventor
Sidney H. Short
by Brown & Darby
Atty's

UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF CLEVELAND, OHIO, ASSIGNOR TO THE WALKER COMPANY, OF NEW JERSEY.

CONTROLLING MECHANISM FOR ELECTRIC-RAILWAY CARS.

SPECIFICATION forming part of Letters Patent No. 630,939, dated August 15, 1899.

Application filed December 7, 1898. Serial No. 698,553. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Pneumatic Controlling Mechanism for Electric-Railway Cars, of which the following is a specification.

This invention relates to pneumatic controlling mechanism for electric-railway cars.

The object of the invention is to provide pneumatically-actuated means for operating the controller wherein the desired rests of the controller-cylinder may be effected in the positions thereof corresponding to different speeds of the motor.

The invention consists, substantially, in the construction, combination, location, and arrangement, all as will be more fully hereinafter set forth, as shown in the accompanying drawing, and finally specifically pointed out in the appended claims.

The drawing shows a view, partly in side elevation and partly in longitudinal section, of an apparatus embodying the principles of my invention.

In my prior patent, No. 559,807, dated March 1, 1898, I have shown, described, and claimed, broadly, a pneumatic controlling mechanism for electric-railway cars wherein the motors throughout a train may all be simultaneously and coincidently controlled pneumatically. In the operation of a system embodying the invention set forth in said patent I have found that when pneumatic pressure is admitted to the train-pipes and to the various cylinders for effecting an actuation of the controllers it exerts its influence directly upon the piston in the air-cylinder to move such piston at once from one of its limits of stroke to the other, thus effecting a complete actuation of the controller. In the operation of electric-railway cars, however, it is important to provide means whereby the controller may be arrested at certain points in its movement in order that the motors may operate at different speeds. For instance, in an interurban road it may be desirable to run the cars at the maximum speed on portions of the road and at reduced speed on other portions of the road, and in elevated railways, for instance, where the same roadway is employed by several branches of roads at certain points in the length thereof it may be desirable to operate the cars at a reduced speed on that portion of the track or roadway used conjointly by the several roads as a safety precaution against accident, while on the individual portions of each road it may be desirable to run the cars at a higher speed. It is difficult to accomplish this result without some means for efficiently controlling the pneumatic devices through which the motor-controllers are actuated. The desired result is secured in the ordinary controllers usually employed on surface lines, where the motorman manually operates the controller-handle, by providing certain notches or points at which the motorman may arrest the rotation of the controller-handle. In a pneumatic system, however, the problem is not so simple, and particularly in a system wherein one or more cars in a train carry their own motor equipments, all of which are controlled from one point.

It is the special purpose of the present invention to provide an arrangement wherein variations in the pressure admitted to the pneumatic controller-actuating mechanism are employed for accomplishing the desired result. In the accompanying drawing I have shown an operative embodiment of the idea as illustrative of the principle involved, wherein A designates the controller; C, the air-cylinder; B, the piston, and D the rack actuated by said piston and engaging a pinion E on the shaft of the controller for actuating the latter. The arrangement of cylinder C, piston B, rack D, and gear E may be in all essential particulars substantially the same as that disclosed in my prior patent above referred to. In the operation of such construction air-pressure is admitted from any suitable source to cylinder C, thus moving piston B from the position thereof indicated in the drawing toward the right, hence effecting the desired actuation of the controller A. If the maximum pressure is admitted to said cylinder, the piston B will be moved to the extreme limit of its travel before it stops, thus moving the controller-cylinder to its ex-

treme limit of movement, which corresponds with the maximum speed of the motor. Of course by suitably controlling the admission of pressure to the cylinder C the piston B may move through only a portion of its travel; but as it is difficult to control the exact degree of pressure thus admitted, and since the spring F, which opposes the pneumatic pressure exerted upon piston B, becomes weakened in the course of time and the force of such spring in one controller-actuating cylinder may vary from that in another controller-actuating cylinder in the same system, it is evident that no uniformity of positions of the pistons B throughout the system can be secured, and hence it is difficult to maintain absolute uniformity in the positions of the controllers, and hence in the speeds of the motors. To avoid this objection, I arrange upon each controller a lug G, arranged to be engaged by the hooked end of a lever H, pivotally mounted and adapted to be rocked by means of a rod J, connected to said lever and forming the stem of a piston K, arranged to operate in an auxiliary cylinder L, fluid-pressure being admitted to said auxiliary cylinder L on one side of piston K, suitable means—such as a spring M, for instance—being arranged to oppose the movement of said piston, and the normal action of said spring being to maintain piston K in position for the hooked end of lever H to intercept lug G and engage the same when the controller-cylinder is rotated through the desired arc. In practice I so relatively arrange lug G upon the controller that when said lug engages the hooked end of lever H the controller-cylinder is in any desired predetermined position. For instance, where two motors are employed this position of the controller corresponds to that condition of the motor-circuit wherein all resistances are cut out and the motors are in series relation to each other. This position corresponds to the slow-speed condition of the motors. Of course any other suitable point in the movement of the controller may be selected, or, if desired, two or more of such points may be employed in connection with each controller, the essential feature being that when the controller is moved through a certain arc it is positively locked against further rotation until released by the actuation of the auxiliary piston, which controls the lock.

I will now describe the construction, arrangement, and operation for effecting the movements of the auxiliary piston.

Pressure is supplied to the main cylinder B from any suitable source and in any suitable manner. As merely illustrative of the principle involved I have shown a pipe P, adapted to communicate with a source of pressure and delivering into the main cylinder through a valve-chamber Q. In this valve-chamber is arranged a valve R, adapted to be seated to close the passage traversed by the air on its way to the cylinder. A spring S is shown for seating said valve. This spring may be regulated so as to permit valve R to unseat only when a certain degree of pressure is admitted to pipe P—say, for instance, and by way of illustration, fifty pounds pressure. From this construction it will be seen that when a pressure of fifty pounds is admitted to supply-pipe P valve Q is unseated, thus permitting the air-pressure to enter cylinder C and actuate main piston D, thus effecting an actuation of the controller until such controller arrives in position to be arrested and positively locked against further rotation by the hooked lever H. The controller will continue in this position and will be held against further movement to whatever degree the air-pressure may be increased. In order, however, to release said lock, I provide a pipe connection T, leading from chamber Q and delivering into auxiliary cylinder L, and I arrange the tension or spring M, by which piston K is maintained normally in the limit of its movement, so that said piston K will move only when a certain air-pressure is admitted to said auxiliary cylinder. For instance, suppose the tension of spring M be arranged so as to be overcome only when a pressure of seventy-five pounds is admitted to said auxiliary cylinder, it will be seen that by the motorman controlling the air-pressure supply so as to admit fifty pounds pressure to the motor-controller-actuating cylinder the controller will be actuated up to a certain point and there arrested, but by admitting seventy-five pounds pressure, which would otherwise have no influence on the action of the controller, the auxiliary piston will be actuated, thus releasing the lock and permitting the controller to be moved a further step or steps to introduce additional variations and circuit conditions in the motor-circuit. In this manner the motor-controller may be arrested at any desired point and maintained at that point under the perfect control of the motorman, thus securing absolute uniformity in the positions of the controllers throughout the entire system.

The construction shown and above described is designed and is merely illustrative of an operative embodiment of the principles of the invention, and many variations and changes in the arrangement and details thereof would readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,

Having now set forth the object and nature of my invention and an apparatus embodying the same and having described the construction, function, and mode of operation thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a pneumatic controlling mechanism for electric-railway cars, the combination with

a controller and means for actuating the same, of a lock for arresting said controller, and pneumatically-actuated means for releasing said lock, as and for the purpose set forth.

2. In a pneumatic controlling mechanism for electric-railway cars, a controller, pneumatically-actuated means for operating said controller, and pneumatically-actuated means for arresting said controller at a predetermined point and releasing the same, as and for the purpose set forth.

3. In a pneumatic controlling mechanism for electric-railway cars, a controller, means for pneumatically actuating said controller, in combination with a lock for said controller, an auxiliary piston actuated by pneumatic pressure, and connections actuated by the movements of said piston for releasing said lock, as and for the purpose set forth.

4. In a pneumatic controlling mechanism for electric-railway cars, a controller, a cylinder and piston for actuating said controller, a passage for admitting fluid-pressure to said cylinder, an auxiliary cylinder communicating with said passage, an auxiliary piston arranged in said auxiliary cylinder, a stop for said controller, and means actuated by said auxiliary piston for releasing said lock, as and for the purpose set forth.

5. In a pneumatic controlling mechanism for electric-railway cars, a controller, an air-cylinder and piston for actuating said controller, a pipe communicating with a source of fluid-pressure and delivering into said cylinder, an auxiliary cylinder and piston communicating with said pipe, yielding means for normally maintaining said auxiliary piston in one limit of its movement, a stop for said controller, and means actuated by the movements of said auxiliary piston for releasing said lock, as and for the purpose set forth.

6. In a pneumatic controlling mechanism for electric-railway cars, a controller having a lug, a hooked lever arranged to engage said lug, a piston connected to said lever, means for normally maintaining said piston in position for said lever to engage said lug, and means for admitting fluid-pressure to said piston, as and for the purpose set forth.

7. In a pneumatic controlling mechanism for electric-railway cars, a controller, an air-cylinder and piston for actuating the same, a pipe connection for supplying air-pressure to said cylinder, a pressure-valve-controlled chamber arranged in said pipe connection, means for arresting the controller at certain points in its movement, an auxiliary cylinder communicating with said chamber, a piston arranged in said auxiliary cylinder, a pressure-spring for moving said piston in one direction, and connections between said piston and said arresting means for releasing the latter, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 3d day of December, 1898, in the presence of the subscribing witnesses.

SIDNEY H. SHORT.

Witnesses:
CHARLES C. OWENS,
W. B. WHITING.